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Part VI

# Environmental Protection Agency

## Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines—Alternative Durability Program

**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Part 86**

**[FRL 1498-6; Docket No. A-80-24]**

## Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines—Alternative Durability Program

**AGENCY:** Environmental Protection Agency.

**ACTION:** Final rule.

**SUMMARY:** These regulations establish an optional pilot program to evaluate an alternative method of determining the durability of emission control in new light-duty vehicles and light-duty trucks. EPA anticipates that a future mandatory durability-data program of this type would reduce motor vehicle certification costs and increase data reliability. EPA will use the information it collects from this pilot program to assess the advantages and cost saving potential of making the program mandatory. If EPA proposes a mandatory program as a result of this pilot effort, the Agency will issue a Notice of Proposed Rulemaking providing the opportunity for public comment.

**DATES:** These regulations are effective June 30, 1980.

**FOR FURTHER INFORMATION CONTACT:** Thomas M. Ball, Technical Support Staff, Certification Division, 2565 Plymouth Road, Ann Arbor, Michigan 48105, Phone: (313) 668-4280.

**SUPPLEMENTARY INFORMATION:** The program offered by this regulation is optional. Manufacturers of light-duty vehicles and light-duty trucks may voluntarily follow the alternative procedures of this regulation instead of the current procedures required in Subpart A of 40 CFR Part 86. This optional program, called the Alternative Durability Program, provides a more flexible, less costly procedure to determine vehicle deterioration factors (d.f.'s). D.f.'s are used in the annual motor vehicle certification process to determine if the new vehicles are capable of meeting the current emission standards over their useful lives.

Manufacturers that elect to participate in this program will be responsible for attesting to the validity of d.f.'s that they establish by alternative means. The manufacturer may determine d.f.'s by any means it deems as appropriate, or may attest to the validity of d.f. estimates that are determined by the procedures minimally required in the Alternative Durability Program. In either case, the manufacturer must provide information to update the minimum d.f.'s each year. (The procedures to establish and update the minimum d.f.'s are outlined below.)

EPA will automatically approve the use of d.f.'s that the manufacturer determines and attests are valid, and that are equal to or greater than the minimum d.f.'s. EPA will not approve the use of d.f.'s that are lower than the minimum d.f.'s.

The detailed procedure to determine the minimum d.f. estimate is explained later in this preamble. (See "Alternative Durability Program Description.") EPA believes that this is a valid procedure to estimate d.f.'s. Briefly, the basic procedure is as follows: EPA will organize engine families with similar designs and emission control systems into engine family groups. Each engine family group will be assigned d.f.'s (one d.f. for each pollutant) that are calculated based on historical certification data. Each year the manufacturer must update the historical d.f. data by testing production durability-data vehicles. Thus, EPA will determine minimum d.f.'s for each engine family group by using past prototype durability-data vehicle d.f.'s, and d.f.'s from production durability-data vehicles tested each year.

EPA believes these changes in the method of determining d.f.'s can potentially reduce regulatory costs to manufacturers and improve the efficient use of EPA resources. This rulemaking does not affect the stringency of the emission standards, but the pilot program allows increased administrative flexibility in the certification program. As part of the pilot program evaluation, EPA will consider comments, data, information, and suggestions when reevaluating the costs and benefits of this alternative program.

### Applicability

The optional provisions of this regulation apply to 1981 through 1984 model year light-duty vehicles and light-duty trucks.

### Certification Cost Reductions

EPA is conducting assessments of alternatives to the current methods of certification. A purpose of this review of certification procedures is to further reduce the costs of regulations without compromising the stringency of the standards. This alternative program is a step in the streamlining of the certification program.

The primary purpose of this pilot program is to assess the possible certification cost reductions from this durability-data vehicle (DDV) testing alternative. EPA does not expect significant cost savings from the pilot program itself since EPA will limit the number of eligible engine families and since manufacturers will not likely commit large portions of their product lines to the voluntary program. However, the 1981 through 1984 model year period of this pilot program will provide information for consideration and possible development of a mandatory program that could result in significant cost savings.

The alternative method EPA will use to determine the minimum d.f.'s will replace much of the testing of prototype DDV's with production DDV testing. One benefit of this change is the reduction in the cost associated with the building of prototype vehicles. The testing of a production vehicle in lieu of a prototype could save an estimated 20 percent per DDV due to the difference in vehicle costs.

Moreover, this alternative concept could produce even greater cost savings by aggregating engine families into engine family groups. Under the current certification regulations, manufacturers are required to run prototype DDV's for each new engine-system combination. Some manufacturers have chosen to submit for certification many more system combinations than they intend to produce. While the reasons for doing this vary, they include a perceived need by the manufacturer to minimize the risk of not certifying (or of certifying with too high a d.f.) through running of additional vehicle designs. This risk is presumably due to both the uncertainty in predicting the exact durability performance of prototype vehicles and the determination of a d.f. based upon data obtained from a single test vehicle.

The voluntary pilot program eliminates the need for engine family proliferation by aggregating engine families into engine family groups and determining a single d.f. for the group by using data obtained from several test vehicles. Since manufacturers need not rely on a single durability-data vehicle to certify an engine family, the need for "backup" engine families should be eliminated.

If manufacturers ran only one DDV per engine family actually produced each year, the combined savings from fewer tests and the use of production vehicles could provide a significant reduction over present durability demonstration costs. Since the durability demonstration is the most costly aspect of the certification program, the reforms evaluated by the pilot program could result in a significant savings to manufacturers in a mandatory program.

**Background**

Section 203(a)(1) of the Clean Air Act prohibits the sale or import of any new motor vehicle unless the vehicle is covered by a certificate of conformity issued under regulations prescribed under Title II of the Act. Section 206(a)(1) of the Act directs the EPA Administrator each year to test or "require to be tested in such manner as he deems appropriate" any new vehicle submitted by the manufacturer to determine if the vehicle conforms with the regulations prescribed under section 202 of the Act.

Under the current certification program (40 CFR Part 86), each manufacturer must submit a detailed description of his anticipated production fleet to EPA. The proposed production fleet is classified into engine families. Vehicles in an engine family have similar or identical engine configurations and other parameters established by EPA.

To determine whether vehilces in a particular engine family will be capable of meeting the exhaust emission standards over their useful lives and thus be certified, a two-phase testing procedure is employed in the current program. The first phase (durability-data vehicle testing) determines the durability of each engine family and emission control system combination (hereafter termed "engine-system combination"). This durability is quantified by measuring the change in emission levels over the 50,000 miles of useful life of a test vehicle and is reflected in the d.f.'s which are determined from the test data. The d.f.'s are determined from test data generated exclusively from test vehilce configurations which are unique to the engine-system combination for which certification is sought. The test vehicle selected to represent the engine-system combination is called a durability-data vehicle (DDV) and is a prototype of vehicles intended to be produced. The prototype DDV is representative of intended production vehicles in its basic design and function but is not required to include final production calibration of individual components (such as the carburetor or distributor). A separate d.f. is established for each exhaust pollutant for each engine-system combination, and is applied to emission-data vehicles as described below.

The second phase of testing (emission-data vehicle testing) estimates the emission levels that production vehicles will likely produce by using the intended production calibrations. Prototype test vehicles called emission-data vehicles (EDV's) are selected to represent several or all of the intended production calibrations within each engine-system combination. The EDV's are tested after accumulating 4,000 miles. For each pollutant, the engine-system combination) d.f. is multiplied by the EDV (of the same engine-system combination) 4,000-mile test result to determine the projected 50,000-mile emission levels. Certification for the engine family can only be granted if the projected emission levels at 50,000 miles for all EDV's within the engine family are within the emission standards for all pollutants.

The alternative program is described below and affects only the durability element of this two-phase testing process. It well enable manufacturers to determine d.f.'s from data obtained from production vehicles including those from other engine families. To further enhance the d.f. data base, the calculation will include data from up to 3 previous model years. These modifications to the current certification procedure are further discussed below.

**Alternative Durability Program Description**

While specific details of the manufacturer's participation will be developed on an individual basis, each agreement between EPA and participating manufacturers will have the following characteristics:

1. The duration of the pilot program will be for a maximum of 4 model years, beginning with the 1981 model year certification program.

2. Participation is voluntary on the part of the manufacturer. All or portions of a manufacturer's product line may be included in this program subject to negotiation between EPA and the manufacturer.

3. The manufacturer must establish appropriate d.f.'s for each engine family either by using the manufacturer's own methods or by accepting the method used to establish the minimum d.f.'s. The manufacturer must attest to the validity of all d.f.'s used for certification under the Alternative Durability Program. EPA will automatically accept for certification d.f.'s that the manufacturer attests are valid, *and* are equal to or greater than the minimum d.f.'s that EPA determined.

4. The manufacturer must provide the minimum data required to determine the minimum d.f.'s, in any case. These data include those from production durability-data vehicles.

EPA will determine the minimum d.f.'s by the following method:

1. The current engine family structure will be retained, but engine families with similar physical and emission control characteristics will be combined into engine family groups. The basic parameters for this grouping are: Manufacture; Light-duty vehicle or light-duty truck; Block configuration; Displacement; Combustion cycle (i.e., Otto or diesel); Catalyst type and usage (i.e., none, oxidation only, or three-way equipped); Others as may be deemed appropriate by the EPA Administrator.

2. Engine family groups will be assigned d.f.'s which are determined using a multiple step method. First, for each engine family within the engine family group, individual d.f.'s are determined by using historical data from previous model years, up to a maximum of 3 years. The d.f. for a particular engine family for a specified previous model year is determined by straight averaging of d.f.'s from each DDV within the engine family. Second, the engine family d.f.'s are sales weighted and averaged to obtain the engine family group d.f.'s for each of the 3 previous model years. Third, the individual engine family group d.f.'s are weighted and averaged in such a manner as to weight the most recent model year's data more heavily. For the three previous model years, EPA is considering weighing the d.f.'s in a ratio of 4:2:1, beginning with the most recent model year.

Where the above general case does not fit a particular situation (e.g., unavailability of data from all the three prior model years), EPA will adjust the method used to determine the engine family group d.f.'s including the weighting factors. However, the adjusted procedure will apply to any other manufacturer in a similar situation. It should be further noted that to improve the method of determining d.f.'s, EPA may revise the method in future model years. The revised method will be applicable to all manufacturers participating in the pilot program.

3. For the first year of participation in the program, a d.f. for each engine family group will be determined using durability data from prototype DDV's only. Shortly after production begins, production vehicles will be durability tested. The d.f. generated by the production vehicles will not retroactively replace the d.f. initially used for certification of that year's production. Instead, this production vehicle d.f. will be averaged with data from prototype DDV's from previous model years to create an updated engine family group d.f. for the second year of the program.

4. The testing procedures (driving schedule, Federal Test Procedure, maintenance, etc.) for production DDV's will be identical in most respects to the

protocol used for prototype vehicles in the existing certification program. Manufacturers may request reductions in the mileage accumulation requirements for some of the production vehicle durability tests. EPA may approve a reduction in the 50,000-mile test requirements after receiving a written request accompanied by justifying information (e.g., the vehicle has experienced a catastrophic failure which would yield subsequent data unrepresentative, or the vehicle being tested is producing data identical to those generated by a vehicle which has already completed testing). The selection and testing of EDV's for each engine family will not be affected by this pilot program.

5. As described in § 86.081–28 of these regulations, d.f.'s from each DDV are established from the best fit straight line through the data points from the 50,000 miles of testing. In the current program, these data are not acceptable if the best fit straight line exceeds the emission standard at any point, unless all measured test points are below the standard. This occurrence has been unofficially termed "line crossing." As with the current program, data from any *prototype* DDV will not be acceptable in the alternative program if line crossing occurs. For *production* DDV's, line crossing will be allowed for the purpose of determining a d.f. only if the 4,000-mile test results multiplied by the engine family group d.f. (established from historical data) does not exceed the standards. Under these regulations, a 4,000-mile test will be substituted for the 5,000-mile DDV test required for prototype DDV's. If, after the 4,000-mile test of the production DDV, the projected 50,000-mile results exceed the standard for one or more pollutants, the manufacturer may withdraw the vehicle (in which case a new DDV will be selected and tested) or proceed with mileage accumulation. However, should the manufacturer proceed with mileage accumulation, the data will be acceptable only if line crossing does not occur.

6. In some cases EPA will require a new prototype DDV for the current model year when, in EPA's judgment, the available historical certification data are insufficient to predict durability performance of a particular engine-system combination (e.g., introduction of a variable venturi carburetor). In this case, EPA will determine a set of d.f.'s unique to this particular engine configuration using the new prototype DDV data and the historical data from the rest of the engine family group. A different set of d.f.'s (not including the new prototype DDV data) will be used to certify all other families within the engine family group. The assigned d.f. used for certification of this new engine-system combination will be based on the sales weighted average of this prototype vehicle d.f. and the other historical engine family data within the engine family group. However, the d.f. from this prototype vehicle will not affect the assigned d.f.'s used for certification of the other families within the engine family group.

7. The specific production vehicles to be tested in this pilot program will be selected by EPA. EPA may select production DDV's from any vehicle design certified by the manufacturer within the engine family group. EPA may select up to three production DDV's per engine family group.

8. Manufacturers may test as many additional production DDV's as they wish. These vehicle designs will be selected by the manufacturer but specific vehicles must be randomly selected as are the EPA-selected vehicles. Included in the calculation of the average d.f. for the engine family group will be the d.f.'s from these additional vehicles.

**Stringency**

EPA believes that this Alternative Durability Program does not alter the stringency of the certification requirements. The use of historical durability data from as many as 3 model years should increase the reliability of d.f., predictions since the d.f.'s used for certification will be based on a larger sample size. At the same time, more recent data in the sample will be counted more heavily since these data should more accurately predict the d.f. (This also creates incentives to improve vehicle durability from year to year.) The aggregation of engine families into engine family groups is necessary in the use of an historical average since design changes create new engine families and emission control systems each year. The engine-system combinations grouped in this manner are technically similar enough that their exhaust emission d.f.'s could be expected to be significantly similar. EPA believes that due to the technical similarity in designs, the individual d.f.'s for each engine-system combination within the engine family group can be adequately represented by the average engine family group d.f.'s. While not analytically validated, EPA believes that the increased size of the sample used to calculate an average d.f. may increase the reliability of the d.f.'s used to achieve certification. (The use of an average d.f. in no way conflicts with EPA's position that every vehicle in use should comply with the emission standards. The purpose of averaging d.f.'s within engine family groups is to increase the data base and, hopefully, the statistical confidence in the d.f.'s that are ultimately used for certification. However, regardless of the d.f.'s that EPA uses to project a vehicle's emissions at 50,000 miles, every vehicle must be capable of meeting the standards in actual use when properly maintained.)

The use of production DDV's is similarly anticipated to increase the reliability of the d.f. prediction, but not result in a change in certification stringency. Under the current program, it is necessary for manufacturers to build prototype DDV's which are representative of their proposed production fleet. As much as practical, actual production hardware has been used, and, where use of prototype components has been necessary, manufacturers and EPA have taken care to simulate as much as possible proposed production designs and manufacturing methods. EPA has not data indicating that the d.f.'s generated from production vehicles differ from d.f.'s generated by prototype vehicles where the vehicles are evaluated according to certification durability program procedures. (One of the purposes of this pilot program is to verify that production vehicles do not get significantly different d.f.'s than historically seen on prototype vehicles.) EPA expects that production vehicles will usually generate d.f.'s significantly the same as would be seen if prototype vehicles were run. No change in stringency is expected due to the use of production rather than prototype DDV's If a manufacturer perceives such a change, the manufacturer may withdraw engine family groups from the alternative durability program. However, if the manufacturer still wishes to certify the engine families within the engine family groups withdrawn, it must meet the mandatory requirements of this subpart.

**Need for Immediate Implementation**

The Agency finds that good cause exists for omitting as unnecessary a notice of proposed rulemaking, public comment, and postponement of the effective date for issuance of these amendments, in that (1) the program is voluntary on the part of the regulated industry and (2) no adverse economic or environmental impacts are anticipated. In addition, immediate implementation of the pilot program is necessary if it is to be utilized on a limited basis for certification for the 1981 model year. This will give manufacturers an

opportunity to derive some cost savings at the earliest possible time and will permit EPA to begin early evaluation of this program to determine whether permanent changes to the certification requirements are appropriate.

**Comments and the Public Docket**

Interested parties are invited to comment during the course of the pilot program to help the Agency evaluate the impacts of the program. Please submit written comments to: U.S. Environmental Protection Agency, Central Docket Section, Attn: A–80–24, Waterside Mall, Room 2902, 401 M Street S.W., Washington, D.C. 20460. The docket may be inspected between the hours of 8:00 a.m. and 4:00 p.m. Monday through Friday. A reasonable charged fee may be charge for copying service.

**Regulatory Analysis**

The Environmental Protection Agency has determined that this is not a significant regulation and therefore does not require a Regulatory Analysis under Executive Order 12044.

Dated: June 24, 1980.

**Douglas M. Costle,**

*Administrator, U.S. Environmental Protection Agency.*

In consideration of the foregoing, Part 86 in Title 40 of the Code of Federal Regulations is revised as follows:

1. The table of contents for Subpart A of Part 86 is amended by adding the following sections in numerical order:

**Subpart A—General Provisions for Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles, 1977 and Later Model Year New Light-Duty Trucks, and for 1977 and Later Model Year New Heavy-Duty Engines.**

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Sec.

86.081–13 Alternative Durability Program.
86.081–24 Test vehicles and engines.
86.081–26 Mileage and service accumulation; emission measurements.

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2. Section 86.081–1 is amended by adding paragraph (d).

**§ 86.081–1 General applicability.**

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(d) *Alternative Durability Program.* For 1981 through 1984 model year light-duty vehicles and light-duty trucks, a manufacturer may elect to participate in the Alternative Durability Program. This optional program provides an alternative method of determining exhaust emission control system durability. The general procedures and a description of the program are contained in § 86.081–13 and specific provisions on test vehicles and compliance procedures are contained in § 86.081–24 and § 86.081–28 respectively.

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3. A new § 86.081–2 is added.

**§ 86.081–2 Definitions.**

The following definition applies beginning with the 1981 model year. The definitions in § 86.079–2 remain effective for this section.

"Engine Family Group" means a combination of engine families for the purpose of determining a minimum deterioration factor under the Alternative Durability Program.

4. A new § 86.081–13 is added.

**§ 86.081–13 Alternative Durability Program.**

(a) The procedures of the Alternative Durability Program are optional. Manufacturers may use these optional procedures to determine deterioration factors instead of using the procedures that this subpart otherwise requires.

(b) The optional procedures of the Alternative Durability Program apply only to light-duty vehicles and light-duty trucks, and are effective only for the 1981 through 1984 model years. All manufacturers of these vehicles are eligible to participate in this program.

(c) For engine families subject to the procedures of the Alternative Durability Program, the manufacturer shall submit deterioration factors to the Administrator for approval to use them for certification. The Administrator shall approve the use of deterioration factors that:

(1) The manufacturer attests are representative of the durability performance of its vehicles in actual field use when maintained according to the manufacturer's maintenance instructions (as limited under § 86.079–25(a)), and

(2) Are equal to or greater than the deterioration factors that EPA determines under paragraph (d) of this section.

(d) EPA shall determine minimum deterioration factors for engine families subject to the Alternative Durability Program. This determination shall be based on a procedure of grouping engine families (see § 86.081–24(a)) in order to use historical certification data to determine deterioration factors for each engine family group. The historical data shall be updated yearly through the testing of production durability-data vehicles. Test vehicle requirements under these procedures are contained in § 86.081–24(c)(1)(iii) and compliance requirements are contained in § 86.081–28(a)(5).

(e) *Request procedures.* (1) A manufacturer wishing to participate in the Alternative Durability Program must submit to the Administrator a written request describing the engine families that the manufacturer elects to be included in the program.

(2) The Administrator may declare ineligible any engine family for which the Administrator determines there is unreasonable risk in determining a deterioration factor using the methods of the Alternative Durability Program. Furthermore, the Administrator may limit the number of engine families within the manufacturer's product line that are eligible for the Alternative Durability Program.

(3) Upon approval of the manufacturer's request to participate, the Administrator and the manufacturer may enter into a written agreement prescribing the terms and conditions of the program. This agreement shall be equitable with agreements entered in with all other manufacturers. The agreement shall specify the following:

(i) The engine families to be included in the program and the engine family groups that have been established by the provisions of § 86.081–24(a) (8) and (9).

(ii) The procedures for the selection of production durability-data vehicles specified under the provisions of § 86.081–24(h).

(iii) The procedures for the determination of minimum exhaust emission deterioration factors for each engine family group.

(f) A manufacturer may elect, at any time, to discontinue participation in this program for all or part of the product line. However, only entire engine family groups may be discontinued. If the manufacturer still wishes to certify any vehicles from a discontinued engine family group, the mandatory requirements of this subpart must be met.

5. A new § 86.081–24 is added. This section is identical to § 86.080–24 except paragraphs (a)(8), (a)(9), (a)(10), and (h) are added, and paragraph (g) is revised.

**§ 86.081–24 Test vehicles and engines.**

(a)(1) The vehicles or engines covered by an application for certification will be divided into groupings of engines which are expected to have similar emission characteristics throughout their useful life. Each group of engines with similar emission characteristics shall be defined as a separate engine family.

(2) To be classed in the same engine family, engines must be identical in all the following respects:

(i) The cylinder bore center-to-center dimensions.

(ii) The dimension from the centerline of the crankshaft to the centerline of the camshaft.

(iii) The dimension from the centerline of the crankshaft to the top of the cylinder block head face.

(iv) The cylinder block configuration (air-cooled or water-cooled; L–6, 90° V–8, etc.).

(v) The location of intake and exhaust valves (or ports) and the valve (or port) sizes (within a ⅛-inch range on the valve head diameter or within 10 percent on the port area).

(vi) The method of air aspiration.

(vii) The combustion cycle.

(viii) Catalytic converter characteristics.

(ix) Thermal reactor characteristics.

(x) Type of air intercooler (e.g., intercoolers and aftercoolers) for diesel heavy-duty engines.

(3) Engines identical in all the respects listed in paragraph (a)(2) of this section may be further divided into different engine families if the Administrator determines that they may be expected to have different emission characteristics. This determination will be based upon a consideration of the following features of each engine:

(i) The bore and stroke.

(ii) The surface-to-volume ratio of the nominally dimensioned cylinder at the top dead center position.

(iii) The intake manifold port size and configuration.

(iv) The exhaust manifold port size and configuration.

(v) The intake and exhaust valve sizes.

(vi) The fuel system.

(vii) The camshaft timing and ignition or injection timing characteristics.

(4) Where engines are of a type which cannot be divided into engine families based upon the criteria listed in paragraphs (a)(2) and (a)(3) of this section, the Administrator will establish families for those engines based upon the features most related to their emission characteristics.

(5) The gasoline-fueled vehicles covered by an application for certification will be divided into groupings which are expected to have similar evaporative emission characteristics throughout their useful life. Each group of vehicles with similar evaporative emission characteristics shall be defined as a separate evaporative emission family.

(6) To be classed in the same evaporative emission family, vehicles must be similar with respect to:

(i) Type of vapor storage device (e.g., canister, air cleaner, crankcase).

(ii) Basic canister design.

(iii) Fuel system.

(7) Where vehicles are of a type which cannot be divided into evaporative emission families based on the criteria listed above, the Administrator will establish families for those vehicles based upon the features most related to their evaporative emission characteristics.

(8) If the manufacturer elects to participate in the Alternative Durability Program, the engine families covered by an application for certification shall be grouped together based upon similar engine design and emission control system characteristics. Each of these groups shall constitute a separate engine family group.

(9) To be classed in the same engine family group, engine families must contain engines identical in all of the following respects:

(i) The combustion cycle.

(ii) The cylinder block configuration (air-cooled or water-cooled; L–6, V–8, rotary, etc.).

(iii) Displacement (engines of different displacement within 50 cubic inches or 15 percent of the largest displacement and contained within a multidisplacement engine family will be included in the same engine family group).

(iv) Catalytic converter usage and basic type (noncatalyst, oxidation catalyst only, three-way catalyst equipped).

(10) Engine families identical in all respects listed in paragraph (a)(9) of this section may be further divided into different engine family groups if the Administrator determines that they are expected to have significantly different exhaust emission control system deterioration characteristics.

(b) *Emission data.* (1) *Emission-data vehicles.* Paragraph (b)(1) of this section applies to light-duty vehicles and light-duty truck emission-data vehicles.

(i) Vehicles will be chosen to be operated and tested for emission data based upon the engine family groupings. Within each engine family, the requirements of this paragraph must be met.

(ii) Vehicles for each engine family will be divided into engine displacement-exhaust emission control system combinations as applicable. A projected sales volume will be established for each combination for the model year for which certification is sought. One vehicle of each combination will be selected in order of decreasing projected sales volume until 70 percent of the projected sales of a manufacturer's total production of vehicles of that engine family is represented, or until a maximum of 4 vehicles is selected. If any single combination represents over 70 percent, then 2 vehicles of that combination will be specified by the Administrator as to such features as engine code, transmission type, fuel system, and inertia weight class.

(iii) The Administrator may select a maximum of four additional vehicles within each engine family based upon features indicating that they may have the highest emission levels of the vehicles in that engine family. In selecting these vehicles, the Administrator will consider such features as the emission control system combination, induction system characteristics, ignition system characteristics, fuel system, rated horsepower, rated torque, compression ratio, inertia weight class, transmission options, and axle ratio.

(iv) If the vehicles selected in accordance with paragraphs (b)(1) (ii) and (iii) of this section do not represent each engine-system combination, then one vehicle of each engine-system combination not represented will be selected by the Administrator. The vehicle selected shall be of the engine displacement with the largest projected sales volume of vehicles with the control system combination in the family and will be designated by the Administrator as to such features as engine code, transmission type, fuel system, and inertia weight class.

(v) Within an engine family, the Administrator may select one additional vehicle for each engine-system combination with which a manufacturer chooses to demonstrate compliance with applicable emission standards at high altitude.

(vi) The Administrator may combine testing requirements for any vehicle selected under paragraph (b)(1)(v) or (b)(1)(vii)(D) of this section with the testing requirements for any similar vehicle in the same engine-system combination selected under paragraph (b)(1) (ii), (iii), or (iv) of this section or any similar vehicle in the same engine-system, evaporative emission family, evaporative emission control system combination selected under paragraph (b)(1)(vii) (A) or (B) of this section. The testing requirements may be combined by the Administrator by requiring a vehicle selected for testing under paragraphs (b)(1) (ii), (iii), (iv), (vii)(A), or (vii)(B) of this section to be modified (if necessary) after mileage accumulation and emission testing for the purpose of demonstrating compliance with § 86.079–23(c)(1)(ii).

(vii)(A) Vehicles of each evaporative emission family with be divided into evaporative emission control systems. One vehicle of each evaporative

emission control system within the evaporative emission family will be selected.

(B) The Administrator may select a maximum of four additional vehicles within each evaporative emission family based upon features indicating that they may have the highest evaporative emission levels of vehicles in that family.

(C) The Administrator may determine that the vehicles selected under paragraphs (b)(1) (ii) through (iv) of this section may be used to satisfy the requirements of paragraphs (b)(1)(vii) (A) and (B) of this section.

(D) The Administrator may also select one additional vehicle for each evaporative emission control system within each evaporative family for those vehicles with which the manufacturer chooses to demonstrate compliance with applicable emission standards at high altitude.

(E) Vehicles selected under paragraph (b)(1)(v) of this section may be used to satisfy the requirements of paragraph (b)(1)(vii)(D) of this section.

(2) *Gasoline-fueled heavy-duty emission-data engines.* Paragraph (b)(2) of this section applies to gasoline-fueled heavy-duty engines.

(i) Engines will be chosen to be run for emission data based upon engine family groupings. Within each engine family, the requirements of this paragraph must be met.

(ii) Engines of each engine family will be divided into engine displacement-exhaust emission control system combinations. A projected sales volume will be established for each combination for the applicable model year. One engine of each combination will be selected in order of decreasing projected sales volume until 70 percent of the projected sales of a manufacturer's total production of engines of that family is represented, or until a maximum of 4 engines is selected. The engines selected for each combination will be specified by the Administrator as to fuel system.

(iii) The Administrator may select a maximum of two additional engines within each engine family based upon features indicating that they may have the highest emission levels of the engines in that engine family. In selecting these engines, the Administrator will consider such features as the exhaust emission control system, induction system characteristics, ignition system characteristics, fuel system, rated horsepower, rated torque, and compression ratio.

(iv) If the engine selected in accordance with paragraphs (b)(2) (ii) and (iii) of this section do not represent each engine displacement-exhaust emission control system combination, then one engine of each engine displacement-exhaust emission control system combination not represented shall be selected by the Administrator.

(3) *Diesel heavy-duty emission-data engines.* Paragraph (b)(3) of this section applies to diesel heavy-duty emission-data engines.

(i) Engines will be chosen to be run for emission data based upon engine family groupings. Within each engine family, the requirements of this paragraph must be met.

(ii) Engines of each engine family will be divided into groups based upon the exhaust emission control system. One engine of each engine-system combination shall be run for smoke emission data and gaseous emission data as prescribed in § 86.084–26(c)(3). Either the complete gaseous emission test or the complete smoke test may be conducted first. Within each combination, the engine that features the highest fuel feed per stroke, primarily at the speed of maximum rated torque and secondarily at rated speed, will usually be selected. If there are military engines with higher fuel rates than other engines in the same engine-system combination, then one military engine shall also be selected. The engine with the highest fuel feed per stroke will usually be selected.

(iii) The Administrator may select a maximum of one additional engine within each engine-system combination based upon features indicating that it may have the highest emission levels of the engines of that combination. In selecting this engine, the Administrator will consider such features as the injection system, fuel system, compression ratio, rated speed, rated horsepower, peak torque speed, and peak torque.

(c) *Durability data.* (1) *Durability-data vehicles.* Paragraph (c)(1) of this section applies to light-duty vehicle and light-duty truck durability-data vehicles except for the production durability-data vehicles selected for the Alternative Durability Program according to paragraph (h)(1) of this section.

(i) A durability-data vehicle will be selected by the Administrator to represent each engine-system combination. The vehicle selected shall be of the engine displacement with the largest projected sales volume of vehicles with the control-system combination on that engine family and will be designated by the Administrator as to transmission type, fuel system, inertia weight class, and test weight.

(ii) A manufacturer may elect to operate and test additional vehicles to represent any engine-system combination. The additional engines must be of the same engine displacement, transmission type, fuel system, and inertia weight class as the vehicle selected for that engine-system combination in accordance with the provisions of paragraph (c)(1)(i) of this section. Notice of an intent to operate and test additional vehicles shall be given to the Administrator not later than 30 days following notification of the test fleet selection.

(2) *Gasoline-fueled heavy-duty durability-data engines.* Paragraph (c)(2) of this section applies to gasoline-fueled heavy-duty durability-data engines.

(i) A durability-data engine will be selected by the Administrator to represent each engine system combination.

(ii) [Reserved]

(iii) A manufacturer may elect to operate and test additional engines to represent any engine-system combination. The additional engines must be of the same engine displacement and fuel system as the engine selected for that combination in accordance with the provisions of paragraph (c)(2)(i) of this section. Notice of an intent to run additional engines shall be given to the Administrator not later than 30 days following notification of the test fleet selection. Deterioration factors calculated for each engine-system combination shall be applied separately to military and nonmilitary engines within the same engine-system combination.

(3) *Diesel heavy-duty durability-data engine.* Paragraph (c)(3) of this section applies to diesel heavy-duty durability-data engines.

(i) One engine from each engine-system combination shall be tested as prescribed in § 86.081–26(c)(3)(ii). At each test point, either the complete gaseous emission test or the complete smoke test may be conducted first. Within each combination, the engine which features the highest fuel feed per stroke, primarily at rated speed and secondarily at the speed of maximum rated torque, will unually be selected for durability testing. In the case where more than one engine in an engine-system combination has the highest fuel feed per stroke, the engine with the highest maximum rated horsepower will usually be selected for durability testing. If an engine-system combination includes both military and nonmilitary engines, then the nonmilitary engine with the highest maximum rated horsepower will usually be selected for durability testing.

(ii) A manufacturer may elect to operate and test additional engines to

represent any engine-system combination. The additional engines must be of the same model and fuel system as the engines selected in accordance with the provisions of paragraph (c)(3)(i) of this section. Notice of an intent to test additional engines shall be given to the Administrator not later than 30 days following notification of the test fleet selection. Deterioration factors calculated for each engine-system combination shall be applied separately to military and nonmilitary engines within the same engine-system combination.

(d) For purposes of testing under § 86.081–26(a)(9) or (b)(11), the Administrator may require additional emission-data vehicles (or emission-data engines) and durability-data vehicles (or durability-data engines) identical in all material respects to vehicles (or engines) selected in accordance with paragraphs (b) and (c) of this section: *Provided*, that the number of vehicles selected shall not increase the size of either the emission-data fleet or the durability-data fleet by more than 20 percent or one vehicle, whichever is greater.

(e) Any manufacturer whose projected sales for the model year in which certification is sought is less than

(1) 2,000 gasoline-fueled light-duty vehicles,

(2) 2,000 diesel light-duty vehicles,

(3) 2,000 gasoline-fueled light-duty trucks,

(4) 2,000 diesel light-duty trucks,

(5) 2,000 gasoline-fueled heavy-duty engines, or

(6) 2,000 diesel heavy-duty engines, may request a reduction in the number of test vehicles (or engines) determined in accordance with the foregoing provisions of this section. The Administrator may agree to such lesser number as he determines would meet the objectives of this procedure.

(f) In lieu of testing an emission-data or durability-data vehicle (or engine) selected under paragraph (b) or (c) of this section, submitting data therefor, a manufacturer may, with the prior written approval of the Administrator, submit exhaust emission data and/or fuel evaporative emission data, as applicable on a similar vehicle (or engine) for which certification has previously been obtained or for which all applicable data required under § 86.078–23 have previously been submitted.

(g)(1) This paragraph applies to light-duty vehicles and light-duty trucks, but does not apply to the production vehicles selected under paragraph (h) of this section.

(2) Where it is expected that more than 33 percent of the vehicles in an engine family will be equipped with an optional item, the full estimate weight of that item shall be included, if required by the Administrator, in the curb weight computation for each vehicle available with that option in the engine family. Where it is expected that 33 percent or less of the vehicles in an engine family will be equipped with an item of optional equipment, no weight for that item will be added in computing curb weight. In the case of mutually exclusive options, only the weight of the heavier option will be added in computing curb weight. Optional equipment weighing less than 3 pounds per item need not be considered.

(3) Where it is expected that more than 33 percent of the vehicles in an engine family will be equipped with an item of optional equipment that can reasonably be expected to influence emissions, then such items of optional equipment shall actually be installed, unless specifically excluded by the Administrator, on all emission-data and durability-data vehicles in the engine family on which the option is intended to be offered in production. Optional equipment that can reasonably be expected to influence emissions are air-conditioner, power steering, power brakes, and other items determined by the Administrator.

(4) Optional equipment that can reasonably be expected to influence emissions which is utilized on 33 percent or less of the vehicles in the engine family shall not be installed on any vehicles in that engine family unless specifically required under this section.

(h) *Alternative Durability Program durability-data vehicles.* Paragraph (h) of this section applies to light-duty vehicle and light-duty truck durability-data vehicles selected under the Alternative Durability Program. The Alternative Durability Program is described in § 86.081–13.

(1) In order to update the durability data to be used to determine a deterioration factor for each engine family group, the Administrator will select durability-data vehicles from the manufacturer's production line. Production vehicles will be selected from the 1981, 1982, and 1983 model year production of vehicles.

(i) The Administrator shall select the production durability-data vehicle designs from the designs that the manufacturer offers for sale. For each model year and for each engine family group, the Administrator may select production durability-data vehicle designs of equal number to the number of engine families within the engine family group, up to a maximum of three vehicles.

(ii) The production durability-data vehicles representing the designs selected in paragraph (h)(1)(i) of this section will be randomly selected from the manufacturer's production. The Administrator will make these random selections unless the manufacturer (with prior approval of the Administrator) elects to make the random selections.

(iii) The manufacturer may select additional production durability-data vehicle designs from within the engine family group. The production durability-data vehicles representing these designs shall be randomly selected from the manufacturer's production in accordance with paragraph (h)(1)(ii) of this section.

(iv) For each production durability-data vehicle selected under paragraph (h)(1) of this section, the manufacturer shall provide to the Administrator (before the vehicle is tested or begins service accumulation) the vehicle identification number. Before the vehicle begins service accumulation the manufacturer shall also provide the Administrator with a description of the durability-data vehicle as specified by the Administrator.

(2) If, within an existing engine family group, a manufacturer requests to certify vehicles of a new design, engine family, emission control system, or with any other durability-related design difference, the Administrator will determine if the existing engine family group deterioration factor is appropriate for the new design. If the Administrator cannot make this determination or deems the deterioration factor not appropriate, the Administrator shall select preproduction durability-data vehicles under the provisions of paragraph (c) of this section. If vehicles are then certified using the new design, the Administrator may select production vehicles with the new design under the provisions of paragraph (h)(1) of this section.

(3) If a manufacturer requests to certify vehicles of a new design that the Administrator determines are a new engine family group, the Administrator shall select preproduction durability-data vehicles under the provisions of paragraph (c) of this section. If vehicles are then certified using the new design, the Administrator may select production vehicles of that design under the provisions of paragraph (h)((1) of this section.

6. A new § 86.081–26 is added. This section is identical to § 86.080–26 except that paragraph (a)(4)(iii) is added and paragraphs (a)(4)(i) and (ii) are revised.

**§ 86.081–26 Mileage and service accumulation; emission measurements.**

(a)(1) Paragraph (a) of this section applies to light-duty vehicles and light-duty trucks.

(2) The procedure for mileage accumulation will be the Durability Driving Schedule as specified in Appendix IV to this part. A modified procedure may also be used if approved in advance by the Administrator. Except with the advance approval of the Administrator, all vehicles will accumulate mileage at a measured curb weight which is within 100 pounds of the estimated curb weight. If the loaded vehicle weight is within 100 pounds of being included in the next higher inertia weight class as specified in § 86.129, the manufacturer may elect to conduct the respective emission tests at the test weight corresponding to the higher loaded vehicle weight.

(3) *Emission-data vehicles.* Unless as otherwise provided for in § 86.079–23(a), emission-data vehicles shall be operated and tested as follows:

(i) *Gasoline-fueled.* (A) Each gasoline-fueled emission-data vehicle shall be driven 4,000 miles with all emission control systems installed and operating. Complete exhaust emission tests shall be conducted at zero miles and 4,000 miles on those vehicles selected under § 86.081–24(b)(1)(ii) through (b)(1)(v). Complete exhaust and evaporative emission tests shall be conducted at zero miles and 4,000 miles on those vehicles selected under § 86.081–24(b)(1)(vii). The manufacturer may, at his option, test the vehicles selected under § 86.081–24(b)(1)(vii) up to three times at the 4,000-mile test point as long as the ± 250-mile test tolerance is adhered to. The Administrator may determine under § 86.081–24(f) that no testing is required.

(B) The emission-data vehicle(s) selected for testing under § 86.081–24(b)(1)(v) or (b)(1)(vii)(D) shall be driven 6, 436 Kilometers (4,000 miles) at any altitude. Emission tests shall be conducted at zero kilometers (zero miles) at any altitude and 6,36 Kilometers (4,000 miles) under high-altitude conditions.

(C) The emission-data vehicle(s) selected for testing under § 86.081–24(b)(1)(v) and permitted to be tested for purposes of § 86.079–23(b)(1)(ii) under the provision of § 86.081–24(b)(1)(vi) shall be driven 6,436 kilometers (4,000 miles) at low altitude. Emission tests shall be conducted at zero kilometers (zero miles) at low altitude and 6,436 kilometers (4,000 miles) under both low- and high-altitude conditions. For the purpose of this subparagraph, "low altitude" means any elevation less than 549 meters (1,800 feet).

(ii) *Diesel.* (A) Each diesel emission-data vehicle shall be driven 6,436 kilometers (4,000 miles) with all emission control systems installed and operating. Emission tests shall be conducted at zero kilometers (zero miles) and 6,436 kilometers (4,000 miles).

(B) The emission-data vehicle(s) selected for testing under § 86.081–24(b)(1)(v) shall be driven 6,436 kilometers (4,000 miles) at any altitude. Emission tests shall be conducted at zero kilometers (zero miles) at any altitude and 6,436 kilometers (4,000 miles) under high-altitude conditions.

(C) The emission-data vehicle(s) selected for testing under § 86.081–24(b)(1)(v) and permitted to be tested for purposes of § 86.079–23(b)(1)(ii) under the provisions of § 86.081–24(b)(1)(vi) shall be driven 6,436 kilometers (4,000 miles) at low altitude. Emission tests shall be conducted at zero kilometers (zero miles) at low altitude and 6,436 kilometers (4,000 miles) under both low- and high-altitude conditions. For the purpose of this subparagraph, "low altitude" means any elevation less than 549 meters (1,800 feet).

(4) Durability-data vehicles. Unless as otherwise provided for in § 86.079–23(a), durability-data vehicles shall be operated and tested as follows:

(i) *Gasoline-fueled.* Each gasoline-fueled durability-data vehicle selected by the Administrator or elected by the manufacturer under § 86.081–24(c)(1) shall be driven, with all emission control systems installed and operating, for 50,000 miles or such lesser distance as the Administrator may agree to as meeting the objective of this procedure. Complete exhaust emission tests shall be made on all durability-data vehicles selected by the Administrator or elected by the manufacturer under § 86.081–24(c) at the following mileage points except as specified by paragraph (a)(4)(iii) of this section: 0; 5,000; 10,000; 15,000; 20,000; 25,000; 30,000; 35,000; 40,000; 45,000 50,000. The Administrator may determine under § 86.081–24(f) that no testing is required.

(ii) *Diesel.* Each diesel durability-data vehicle shall be driven, with all emission control systems installed and operating, for 50,000 miles or such lesser distance as the Administrator may agree to as meeting the objectives of the procedure. Complete emission tests (see § 86.106 through 86.145) shall be made at the following milege points except as specified by paragraph (a)(4)(iii) of this section: 0; 5,000; 10,000; 15,000; 20,000; 25,000; 30,000; 35,000; 40,000; 45,000; 50,000.

(iii) Production durability-data vehicles selected under § 86.081–24(h)(1) shall be driven and tested in accordance with paragraphs (a)(4)(i) and (a)(4)(ii) of this section with the exception that the emission test specified for the 5,000-mile point shall be conducted at the 4,000-mile point.

(5) All tests required by this subpart for durability-data vehicles and for emission-data vehicles must be conducted at any accumulated mileage within 250 miles of each of those test points.

(6)(i) The results of each emission test shall be supplied to the Administrator immediately after the test. The manufacturer shall furnish to the Administrator explanations for voiding any test. The Administrator will determine if voiding the test was appropriate based upon the explanation given by the manufacturer for the voided test. If a manufacturer conducts multiple tests at any test point at which the data are intended to be used in the calculation of the deterioration factor, the number of tests must be the same at each point and may not exceed three valid tests. Tests between test points may be conducted as required by the Administrator. Data from all tests (including voided tests) shall be air posted to the Administrator within 24 hours (or delivered within 3 working days). In addition, all tests shall be compiled and provided to the Administrator in accordance with § 86.079–23. Where the Administrator conducts a test on a durability-data vehicle at a prescribed test point, the results of that test will be used in the calculation of the deterioration factor.

(ii) The results of all emission tests shall be rounded, using the "rounding off method" specified in ASTM E 29–67, to the number of places to the right of the decimal point indicated by expressing the applicable emission standards of this subpart to three significant figures.

(7) Whenever the manufacturer proposes to operate and test a vehicle which may be used for emission or durability data, he shall provide the zero-mile test data to the Administrator (except for those vehicles for which the zero-mile test requirement has been waived under § 86.079–23(a)(2)) and make the vehicle available for such testing under § 86.081–29 as the Administrator may require before beginning to accumulate mileage on the vehicle. Failure to comply with this requirement will invalidate all test data submitted for this vehicle.

(8) Once a manufacturer begins to operate an emission-data or durability-data vehicle, as indicated by compliance with paragraph (a)(7) of this section, he

shall continue to run the vehicle to 4,000 miles or 50,000 miles, respectively, and the data from the vehicle will be used in the calculations under § 86.081–28. Discontinuation of a vehicle shall be allowed only with the written consent of the Administrator.

(9)(i) The Administrator may elect to operate and test any test vehicle during all or any part of the mileage accumulation and testing procedure. In such cases, the manufacturer shall provide the vehicle(s) to the Administrator with all information necessary to conduct this testing.

(ii) The test procedures in § 86.106 through 86.145 will be followed by the Administrator. The Administrator will test the vehicles at each test point. Maintenance may be performed by the manufacturer under such conditions as the Administrator may prescribe.

(iii) The data developed by the Administrator for the engine-system combination shall be combined with any applicable data supplied by the manufacturer on other vehicles of that combination to determine the applicable deterioration factors for the combination. In the case of a significant discrepancy between data developed by the Administrator and that submitted by the manufacturer, the Administrator's data shall be used in the determination of deterioration factors.

(10) Emission testing of any type with respect to any certification vehicle other than that specified in this part is not allowed except as such testing may be specifically authorized by the Administrator.

(11) This section does not apply to testing conducted to meet the requirements of § 86.079–23(b)(2).

(b)(1) Paragraph (b) of this section applies to heavy-duty engines.

(2)(i) For gasoline-fueled engines, the dynamometer service accumulation schedule will consist of several operating conditions which give the percent loads and the modes as specified in the following chart. The percentage of time in each mode must be held within the limits specified. The maximum observed torque for each mode in the service accumulation cycle must be determined at the rpm at which the mode is being conducted. The percent load for that mode will be determined from the maximum torque at the rpm at which the mode is being conducted.

| Mode | Observed torque (percentage of maximum observed) | Percentage of time |
|---|---|---|
| Idle | Idle | 23 (22 to 24) |
| CT | CT | 14 (13 to 15) |
| PTD | 10 | 6 (5 to 7) |
| Cruise | 25 | 31 (30 to 32) |
| PTA | 55 | 15 (14 to 16) |
| FL | 90 | 11 (10 to 12) |

(ii) The equivalent control parameter for engine loading will be manifold vacuum, manifold pressure, or torque. Usage of one of the three parameters will require approval in advance by the Administrator. The control parameter values that correspond to the appropriate percent loads as specified in the emission test cycle will be initially determined at the zero-hour point or after an appropriate break-in procedure. The control parameter values determined initially will be used for the entire service accumulation schedule. If at any time during the service accumulation the 90 percent torque value cannot be attained, the engine shall be operated at wide-open throttle.

(iii) The average speed shall be between 1,650 and 1,700 rpm. Subject to the requirements as to average speed, there must be operation at speeds in excess of 3,200 rpm (but not in excess of governed speed for governed engines or rated speed for nongoverned engines) for a cumulative maximum of 0.5 percent of the actual cycle time, excluding time in transient conditions. Maximum cycle time shall be 15 minutes. A cycle approved in advance by the Administrator shall be used.

(3)(i) For diesel engines, the following criteria must be met before service accumulation can begin. Failure to comply with these requirements shall invalidate all test data submitted for an engine.

(A) Each engine shall produce at least 95 percent of the maximum horsepower, corrected to rating conditions, at 95 to 100 percent of the rated speed.

(B) The fuel rate at maximum horsepower shall be within manufacturer's specifications.

(ii) During service accumulation, hours can be credited toward the required service accumulation hours when the following criteria are met. If these criteria cannot be met, engine operation shall be discontinued and the Administrator shall be notified immediately. (Adjustments to the fuel rate can be approved under the provisions of § 86.079–25.)

(A) Each engine shall produce at least 95 percent of the maximum horsepower, at 95 to 100 percent of the rated speed, observed at the zero-hour point. Horsepower values shall be corrected to the rating conditions.

(B) The engine shall be operated at 75 percent of the inlet and exhaust restrictions specified in § 86.079–8 except that the tolerance will be ±3 inches of water and ±0.5 inch of HG respectively.

(C) During each emission test the inlet and exhaust restrictions shall be as specified in § 86.079–8.

(4) If a break-in procedure is used, the procedure must be the same as recommended to the ultimate purchaser. Prior approval by the Administrator is required for use of any break-in procedure. The hours accumulated during the break-in procedure will not be counted as part of the service accumulation.

(5) Emission-data engines: Each emission-data engine shall be operated for 125 hours with all emission control systems installed and operating. An emission test shall be conducted at 125 hours. A zero-hour emission may be performed after the engine has been approved by the Administrator to begin service accumulation. Evaporative emission controls need not be connected provided normal operating conditions are maintained in the engine induction system.

(6) Durability-data engines: Each gasoline-fueled durability-data engine shall be operated, with all emission control systems installed and operating, for 1,500 hours. Each diesel durability-data engine shall be operated for 1,000 hours. Emission measurement, as prescribed, shall be made at 125-hour intervals beginning at 125 hours of operation. A zero-hour emission test may be performed after the engine has been approved by the Administrator to begin service accumulation. Evaporative emission controls need not be connected provided normal operating conditions are maintained in the engine induction system.

(7) All tests required by this subpart to be conducted after 125 hours of operation or at any multiple of 125 hours may be conducted at any accumulated number of hours within 8 hours of 125 hours or the appropriate multiple of 125 hours respectively.

(8)(i) Data from all emission tests (including voided tests) shall be air posted to the Administrator within 72 hours (or delivered within 5 working days). The manufacturer shall furnish to the Administrator an explanation for voiding any test. The Administrator will determine if voiding the testing was appropriate based upon the explanation given by the manufacturer for the voided test. If a manufacturer conducts multiple tests at any test point at which the data are intended to be used in the calculation of the deterioration factor.

the number of tests must be the same at each point and may not exceed three valid tests. Tests between test points may be conducted as required by the Administrator. In addition, all test data shall be compiled and provided to the Administrator in accordance with § 86.079–23. Where the Administrator conducts a test on a durability-data engine at a prescribed test point, the results of that test will be used in the calculation of the deterioration factor.

(ii) The results of all emission tests shall be recorded and reported to the Administrator using two places to the right of the decimal point. These numbers shall be rounded in accordance with the "rounding off method" specified in ASTM E 29–67.

(9) Whenever the manufacturer proposes to operate and test an engine which may be used for emission or durability data, he shall provide such information concerning components used on the engine as the Administrator may require and make the engine available for such testing under § 86.081–29 as the Administrator may require, before beginning to accumulate hours on the engine. Failure to comply with this requirement will invalidate all test data later submitted for this engine.

(10) Once a manufacturer begins to operate an emission-data or durability-data engine, as indicated by compliance with paragraph (b)(9) of this section, he shall continue to run any emission-data engine to 125 hours, any gasoline-fueled durability-data engine to 1,500 hours, and any diesel durability-data engine to 1,000 hours. The data from the engine will be used in the calculations under § 86.345. Discontinuation of an engine shall be allowed only with the prior written consent of the Administrator.

(11)(i) The Administrator may elect to operate and test any test engine during all or any part of the service accumulation and testing procedure. In such cases, the manufacturer shall provide the engine(s) to the Administrator with all information necessary to conduct the testing.

(ii) The test procedure (Subparts D of this part for gasoline-fueled engines, and Subparts I and D of this part for diesel engines) will be followed by the Administrator. The Administrator will test the engines at each test point. Maintenance may be performed by the manufacturer under such conditions as the Administrator may prescribe.

(iii) The data developed by the Administrator for the engine-system combination shall be combined with any applicable data supplied by the manufacturer on other engines of that combination to determine the applicable deterioration factors for the combination. In the case of a significant discrepancy between data developed by the Administrator and those submitted by the manufacturer, the Administrator's data shall be used in the determination of deterioration factors.

(12) Emission testing of any type with respect to any certification engine other than that specified in the subpart is not allowed except as such testing may be specifically authorized by the Administrator.

7. Section 81.081–28 is amended by revising paragraph (a)(4) and adding paragraph (a)(5).

**§ 86.081–28 Compliance with emission standards.**

(a) * * *

(4) The procedure for determining compliance of a new motor vehicle with exhaust emission standards is as follows, except where specified by paragraph (a)(5) of this section for the alternative Durability Program: * * *

* * * * *

(5) The procedure to determine the compliance of new motor vehicles in the Alternative Durability Program (described in § 86.081–13) is the same as described in paragraphs (a)(4)(iii) through (a)(4)(v) of this section. For the engine families that are included in the Alternative Durability Program, the exhaust emission deterioration factors used to determine compliance shall be those that the Administrator has approved under § 86.081–13(c). The evaporative emission deterioration factor for each evaporative emission family shall be determined and applied according to paragraph (a)(4) of this section. The procedure to determine the minimum exhaust emissions deterioration factors required under § 86.081–13(d) are as follows:

(i) Separate deterioration factors shall be determined from the exhaust emission results of the durability-data vehicles for each engine family group. A separate factor shall be established for exhaust HC, exhaust CO, and exhaust $NO_x$ for each engine family group. The evaporative emission deterioration factor for each evaporative family will be determined and applied in accordance with the procedure of paragraph (a)(4) of this section.

(ii) The deterioration factors for each engine family group shall be determined by the Administrator using historical durability data from as many as 3 previous model years. These data will consist of deterioration factors generated by durability-data vehicles representing certified engine families and of deterioration factors from vehicles selected under § 86.081–24(h). The Administrator shall determine how these data will be combined for each engine family group.

(A) The test results to be used in the calculation of each deterioration factor to be combined for each engine family group shall be those test results specified in paragraph (a)(4)(i)(A) of this section.

(B) For each durability-data vehicle selected under § 86.081–24(h), all applicable exhaust emission results shall be plotted as a function of the mileage on the system, rounded to the nearest mile, and the best fit straight lines, fitted by the method of least squares, shall be drawn through all these data points. The exhaust deterioration factor for each durability-data vehicle shall be calculated as specified in paragraph (a)(4)(i)(B) of this section.

(C) *Line crossing.* For the purposes of paragraph (a)(5) of this section, line crossing occurs when either of the interpolated 4,000- and 50,000-mile points of the best fit straight line exceeds the applicable emission standard *and* at least one applicable data point exceeds the standard.

(1) The Administrator will not accept for certification line-crossing data from preproduction durability-data vehicles selected under § 86.081–24(c)(1), § 86.081–24 (h)(2), or (h)(3).

(2) The Administrator will not accept for certification line-crossing data from production durability-data vehicles selected under § 86.081–24(h)(1) *unless* the following is true: The 4,000-mile test result multiplied by the engine family group deterioration factor does not exceed the applicable emission standard. The deterioration factors used for this purpose shall be those that were used in the certification of the production vehicle. Manufacturers may calculate this product immediately after the 4,000-mile test of the vehicle. If the product exceeds the applicable standard, the manufacturer may, with the approval of the Administrator, discontinue the vehicle and substitute a new vehicle. The manufacturer may continue the original vehicle, but the data will not be acceptable if line crossing occurs.

(b)(1) Paragraph (b) of this section applies to heavy-duty engines.

* * * * *

8. Section 86.084–24 is amended by adding paragraphs (a)(8), (a)(9), (a)(10), and (h), and by revising paragraph (g)(1).

**§ 86.084–24 Test vehicles and engines.**

(a) * * *

(8) If the manufacturer elects to participate in the Alternative Durability Program, the engine families covered by an application for certification shall be

grouped together based upon similar engine design and emission control system characteristics. Each of these groups shall constitute a separate engine family group.

((9) To be classed in the same engine family group, engine families must contain engines identical in all of the following respects:

(i) The combustion cycle.

(ii) The cylinder block configuration (air-cooled or water-cooled; L–6, V–8, rotary, etc.).

(iii) Displacement (engines of different displacement within 50 cubic inches or 15 percent of the largest displacement and contained within a multidisplacement engine family will be included in the same engine family group).

(iv) Catalytic converter usage and basic type (non-catalyst, oxidation catalyst only, three-way catalyst equipped).

(10) Engine families identical in all respects listed in paragraph (a)(9) of this section may be further divided into different engine family groups if the Administrator determines that they are expected to have significantly different exhaust emission control system deterioration characteristics.

* * * * *

(g)(1) This paragraph applies to light-duty vehicles and light-duty trucks, but does not apply to the production vehicles selected under paragraph (h) of this section.

* * * * *

(h) *Alternative Durability Program durability-data vehicles.* Paragraph (h) of this section applies to light-duty vehicle and light-duty truck durability-data vehicles selected under the Alternative Durability Program. The Alternative Durability Program is described in § 86.081–13.

(1) In order to update the durability data to be used to determine a deterioration factor for each engine family group, the Administrator will select durability-data vehicles from the manufacturer's production line. Production vehicles will be selected from the 1981, 1982, and 1983 model year production of vehicles.

(i) The Administrator shall select the production durability-data vehicle designs from the designs that the manufacturer offers for sale. For each model year and for each engine family group, the Administrator may select production durability-data vehicle designs of equal number to the number of engine families within the engine family group, up to a maximum of three vehicles.

(ii) The production durability-data vehicles representing the designs selected in paragraph (h)(1)(i) of this section will be randomly selected from the manufacturer's production. The Administrator will make these random selections unless the manufacturer (with prior approval of the Administrator) elects to make the random selections.

(iii) The manufacturer may select additional production durability-data vehicle designs from within the engine family group. The production durability-data vehicles representing these designs shall be randomly selected from the manufacturer's production in accordance with paragraph (h)(1)(ii) of this section.

(iv) For each production durability-data vehicle selected under paragraph (h)(1) of this section, the manufacturer shall provide to the Administrator (before the vehicle is tested or begins service accumulation) the vehicle identification number. Before the vehicle begins service accumulation, the manufacturer shall also provide the Administrator with a description of the durability-data vehicle as specified by the Administrator.

(2) If, within an existing engine family group, a manufacturer requests to certify vehicles of a new design, engine family, emission control system, or with any other durability-related design difference, the Administrator will determine if the existing engine family group deterioration factor is appropriate for the new design. If the Administrator cannot make this determination or deems the deterioration factor not appropriate, the Administrator shall select preproduction durability-data vehicles under the provisions of paragraph (c) of this section. If vehicles are then certified using the new design, the Administrator may select production vehicles with the new design under the provisions of paragraph (h)(1) of this section.

(3) If a manufacturer requests to certify vehicles of a new design that the Administrator determines are a new engine family group, the Administrator shall select preproduction durability-data vehicles under the provisions of paragraph (c) of this section. If vehicles are then certified using the new design, the Administrator may select production vehicles of that design under the provisions of paragraph (h)(1) of this section.

9. Section 86.084–26 is amended by revising paragraphs (a)(4)(i) and (a)(4)(ii), and by adding paragraph (a)(4)(iii).

**§ 86.084–26 Mileage and service accumulation; emission measurements.**

(a) * * *

(4) *Durability-data vehicles.* Unless as otherwise provided for in § 86.079–23(a), durability-data vehicles shall be operated and tested as follows:

(i) *Gasoline-fueled.* Each gasoline-fueled durability-data vehicle selected by the Administrator or elected by the manufacturer under § 86.084–24(c)(1) shall be driven, with all emission control systems installed and operating, for 50,000 miles or such lesser distance as the Administrator may agree to as meeting the objective of this procedure. Complete exhaust emission tests shall be made on all durability-data vehicles selected by the Administrator or elected by the manufacturer under § 86.084–24(c) at the following mileage points except as specified by paragraph (a)(4)(iii) of this section: 0; 5,000; 10,000; 15,000; 20,000; 25,000; 30,000; 35,000; 40,000; 45,000; and 50,000. The Administrator may determine under §86.084–24(f) that no testing is required.

(ii) *Diesel.* Each diesel durability-data vehicle shall be driven, with all emission control systems installed and operating, for 50,000 miles or such lesser distance as the Administrator may agree to as meeting the objectives of the procedure. Complete emission tests (see §§ 86.106 through 86.145) shall be made at the following mileage points except as specified by paragraph (a)(4)(iii) of this section: 0; 5,000; 10,000; 15,000; 20,000; 25,000; 30,000; 35,000; 40,000; 45,000; and 50,000.

(iii) Production durability-data vehicles selected under § 86.084–24(h)(1) shall be driven and tested in accordance with paragraphs (a)(4)(i) and (a)(4)(ii) of this section with the exception that the emission test specified for the 5,000-mile point shall be conducted at the 4,000-mile point.

* * * * *

10. Section 86.084–28 is amended by revising paragraph (a)(4) and adding paragraph (a)(5).

**§ 86.084–28 Compliance with emission standards.**

(a) * * *

(4) The procedure for determining compliance of a new motor vehicle with exhaust emission standards is as follows, except where specified by paragraph (a)(5) of this section for the Alternative Durability Program:

* * * * *

(5) The procedure to determine the compliance of new motor vehicles in the Alternative Durability Program (described in § 86.081–13) is the same as described in paragraphs (a)(4)(iii) through (a)(4)(v) of this section. For the

engine families that are included in the Alternative Durability Program, the exhaust emission deterioration factors used to determine compliance shall be those that the Administrator has approved under § 86.081–13(c). The evaporative emission deterioration factor for each evaporative emission family shall be determined and applied according to paragraph (a)(4) of this section. The procedure to determine the minimum exhaust emission deterioration factors required under § 86.081–13(d) are as follows:

(i) Separate deterioration factors shall be determined from the exhaust emission results of the durability-data vehicles for each engine family group. A separate factor shall be established for exhaust HC, exhaust CO, and exhaust NOx for each engine family group. The evaporative emission deterioration factor for each evaporative family will be determined and applied in accordance with the procedure of paragraph (a)(4) of this section.

(ii) The deterioration factors for each engine family group shall be determined by the Administrator using historical durability data from as many as 3 previous model years. These data will consist of deterioration factors generated by durability-data vehicles representing certified engine families and of deterioration factors from vehicles selected under § 86.084–24(h). The Administrator shall determine how these data will be combined for each engine family group.

(A) The test results to be used in the calculation of each deterioration factor to be combined for each family group shall be those test results specified in paragraph (a)(4)(i)(A) of this section.

(B) For each durability-data vehicle selected under § 86.084–24(h), all applicable exhaust emission results shall be plotted as a function of the mileage on the system, rounded to the nearest mile, and the best fit straight lines, fitted by the method of least squares, shall be drawn through all these data points. The exhaust deterioration factor for each durability-data vehicle shall be calculated as specified in paragraph (a)(4)(i)(B) of this section.

(C) *Line crossing.* For the purposes of paragraph (a)(5) of this section, line crossing occurs when either of the interpolated 4,000- and 50,000-mile points of the best fit straight line exceeds the applicable emission standard *and* at least one applicable data point exceeds the standard.

(*1*) The Administrator will not accept for certification line-crossing data from preproduction durability-data vehicles selected under § 86.084–24(c)(1), § 86.084–24 (h)(2), or (h)(3).

(*2*) The Administrator will not accept for certification line-crossing data from production durability-data vehicles selected under § 86.084–24(h)(1) *unless* the following is true: The 4,000-mile test result multiplied by the engine family group deterioration factor does not exceed the applicable emission standard. The deterioration factors used for this purpose shall be those that were used in the certification of the production vehicle. Manufacturers may calculate this product immediately after the 4,000-mile test of the vehicle. If the product exceeds the applicable standard, the manufacturer may, with the approval of the Administrator, discontinue the vehicle and sutstitute a new vehicle. The manufacturer may continue the original vehicle, but the data will not be acceptable if line crossing occurs.

(b)(1) Paragraph (b) of this section applies to heavy-duty engines.

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(Sections 206 and 301(a) of the Clean Air Act, as amended, 42 U.S.C. 7525 and 7601(a))

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